

REMARKS

This is responsive to the Office Action mailed June 14, 2004 in which the Examiner rejected claims 1-5 under §102(e) as being anticipated by U.S. Publication No. US 2001/0039126 to Ebinuma et al., rejected claims 6-8 under §103(a) as being obvious over Ebinuma et al. in view of Patent No. 5,132,776 to Hanada et al., and, rejected claim 9 under §103(a) as being obvious over the combination of Ebinuma et al. and Patent No. 6,658,207 to Partynski et al. New claims 10 and 11 have been added, claims 1, 5 and 9 cancelled and claim 2, 4 and 6-8 amended. Reconsideration of these rejections is respectfully requested.

Applicant's Invention

This invention is directed to a holding device for an optical element, and is particularly useful in applications such as an objective for an aerial camera which must be light weight and stable in the event of temperature fluctuations. The holding element includes an objective housing and one or more mounts, supported by the housing, which hold an optical element such as a lens. The objective housing and mount(s) each are formed of a silicon-containing aluminum material having a coefficient of thermal expansion which substantially matches that of the lens or other optical element.

Importantly, both the objective housing and mount are formed of the silicon-containing aluminum material. In this way, mechanical stresses between the mount and lens, as well as between the mount and objective housing, are maintained substantially constant over a wide temperature range. In an aerial picture camera, for example, high stability requirements are placed on the objective housing and mounts in order for the camera to provide a geometrically accurate image of an image area. Mechanical stresses exerted between the mount(s) and lens, or between the objective housing and mount(s), can lead to excessive distortion and inadequate imaging

performance. These potential problems are solved in the subject invention by forming both the mount(s) and objective housing substantially entirely of a silicon-containing aluminum material, as noted above.

Discussion of Rejections and Prior Art

New claims 10 and 11 have been added to stress the advantageous feature of the present invention wherein both the objective housing and mount(s) are formed of a silicon-containing aluminum material. The Ebinuma et al. reference suggests in Section [0058] that the member 21 (mount) may be formed of an aluminum die-casting alloy of aluminum-silicon-copper. However, there is no teaching or suggestion of forming the objective housing or supporting member 3 of the same material. In fact, Ebinuma et al. teaches that a material "having any thermal expansion coefficient" may be employed to form the supporting member 3. See Section [0059]. As noted above, this would create mechanical stress between the objective housing or support and the mount(s) for the lens or other optical member, leading to excessive distortion and inadequate imaging performance.

The defect of the Ebinuma et al. reference is not cured by Hanada et al. or Partynski et al. Hanada et al. is directed to a holder for a semiconductor device. It is cited as teaching a particular type of aluminum which has a relatively high silicon content so as to match the coefficient of thermal expansion of a semiconductor device placed on a section made of such material. Hanada et al. has nothing to do with an aerial picture camera or any other type of optical instrument, and fails to disclose or suggest that the aluminum material used therein would or could be suitable for use in a mount and an objective housing for an optical device. There is no motivation to one of ordinary skill in the art in either Ebinuma et al. or Hanada et al. to make the combination suggested by the Examiner.

Partynski et al. teaches an aerial picture camera, but the Examiner has cited no teaching in that reference of employing silicon-containing aluminum material to form both the objective housing and the optical element mount(s).

A Supplemental Information Disclosure Statement is attached hereto in which a concise explanation is provided of the relevance of the foreign language references cited in the Statements filed November 19, 2003 and January 9, 2004. In each case, such references disclose the characteristics of the silicon-containing aluminum material employed in this invention.

A Petition for a two-month Extension of Time is enclosed. The Commissioner is authorized to charge the requisite fee to undersigned's Deposit Account No. 08-2625.

In view of the amendment to the claims, and the argument given above, applicant considers this case to be in a condition for allowance and respectfully requests the case be passed to allowance.

Respectfully submitted,

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